Trematodes

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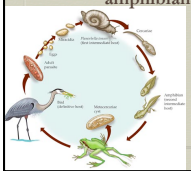
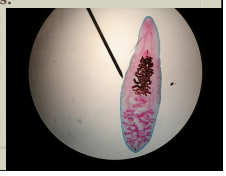
Agenda

- What are trematodes?
- Trematode life cycle
- How are amphibians infected?
- What are the effects of infection?
- Factors contributing to infection
- Real world declines in amphibian populations

What is a trematode?

- Parasitic organisms that move from host to host in a defined cycle.
- In the case of *Ribeiroia spp.* the cycle starts with wading birds, moves to snails, then moves to amphibians, then back to birds.





How are amphibians infected?

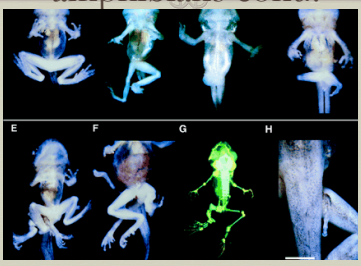
- https://www.youtube.com/watch?v=u3zbwWfoYmg

How do trematodes affect amphibians?

- Limb extensions
- Extra limbs
- Partially missing limbs
- Skin fusions

Johnson et. al. 1999

How do Trematodes affect amphibians cont.?



Johnson et. al. 1999

What other factors affect trematode infections?

- Herbicides such as atrazine.
  - This chemical increases the abundance of freshwater snails
  - The increase in freshwater snails increases the abundance of larval trematodes.
  - The chemical also increases the susceptibility of amphibians to larval trematodes.

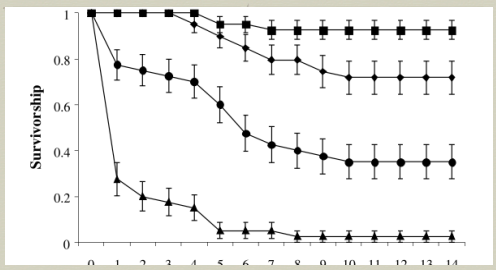
Rohr et. al. 2008

Declines

- Study was done on Northern Leopard Frogs
- This study focused mainly on mortality due to infection before the tadpole metamorphosed.
- Infections before limb buds caused a 47.5%-97.5% mortality.
- Infections after limb buds were developed resulted in a high malformation percentage.

Schotthoefer et. al. 2003

Declines cont.



Schotthoefer et. al. 2003

So why is all this important?

- Trematodes are an active parasite that influences the behavior of amphibians.
- They alter the limb development of adult amphibians, and have a high mortality rate in tadpoles before the emergence of their limb buds.
- The trematode actually wants the amphibian to be eaten by a wading bird so that it can complete it's lifecycle.

Summary

- What a trematode is.
- Trematode life cycle phases
- Infection vectors
- How are amphibians affected
- What other factors contribute to trematode infection
- Real world example of declines and mortality

Questions?

Literature Cited

- Pieter T. J. Johnson, Kevin B. Lunde, Euan G. Ritchie, and Alan E. Launer 1999. The Effect of Trematode Infection on Amphibian Limb Development and Survivorship. *Science* 30 April: 284 (5415), 802-804.
- Rohr, Jason R., et al. 2008. Agrochemicals increase trematode infections in a declining amphibian species. *Nature* 455.7217: 1235-1239.
- Schotthoefer, Anna M., et al. 2003. Influence of Ribeiroia ondatrae (Trematoda: Digenea) infection on limb development and survival of northern leopard frogs (Rana pipiens): effects of host stage and parasite-exposure level. *Canadian Journal of Zoology* 81.7: 1144-1153.